

Claims

1. A bed for detecting shift of a position of a bedded person on a bedding surface, comprising:

a first pressure sensitive sensor and a second pressure sensitive sensor each having a cable shape, disposed separately along side edges of the bedding surface at both end sides in a width direction of the bedding surface, respectively, each of which detects an acceleration component caused by a movement of a bedded person; and

determination means which compares output signals from the first pressure sensitive sensor and the second pressure sensitive sensor to determine a shift state of the bedded person toward a side portion of the bedding surface.

2. A bed according to claim 1, wherein the first pressure sensitive sensor and the second pressure sensitive sensor are arranged in a manner that a wiring density on a head portion side of the bedded person is set to be higher than other region.

3. A bed according to claim 1 or 2, wherein the first pressure sensitive sensor and the second pressure sensitive sensor are arranged in a manner that a wiring density on a leg portion side of the bedded person is set to be lower than other region.

4. A bed according to claim 2 or 3, wherein the first pressure sensitive sensor and the second pressure sensitive sensor are wired in a wave shape on the bedding surface, and the wiring density is changed in accordance with an interval between adjacent waves of the wave shape.

5. A bed according to one of claims 1 to 4, wherein projection pieces are disposed on an upper side or a lower side of the pressure sensitive sensor and are overlapped on the pressure sensitive sensor at plural portions thereof.

6. A bed according to claim 5, wherein the pressure sensitive sensor is adhered to a sheet and the projection pieces are adhered to a sheet, and the pressure sensitive sheet to which the pressure sensitive sensor is adhered and the projection piece sheet to which the projection pieces are adhered are laminated to each other.

7. A bed according to one of claims 1 to 6, wherein the determination means outputs a notification signal when it is determined that positional shift of the bedded person on the bedding surface arises, and notification means is further provided which
5 notifies occurrence of shift in response to the notification signal outputted from the determination means.

8. An in-bed detection method of a bed for detecting shift of a position of a bedded person on a bedding surface, comprising the steps of:

10 obtaining a ratio between intensities of output signals from a first pressure sensitive sensor and a second pressure sensitive sensor each having a cable shape, disposed separately along side edges of the bedding surface at both end sides in a width direction of the bedding surface, respectively, each of which detects an acceleration component caused by a movement of a bedded person; and

15 determining that positional shift of the bedded person on the bedding surface arises when the ratio is in a predetermined range set in advance.

9. In a bed which includes at least one of a back raising panel portion and a knee raising panel portion and driving means which performs elevational driving of at least
20 one of the back raising panel portion and the knee raising panel portion, and which is capable of attaching a side fence, the bed is characterized by comprising:

a pressure sensitive sensor which is disposed at an entire periphery or a part of a surface end portion of at least one of the back raising panel portion and the knee raising panel portion;

25 determination means which determines touch of a bedded person to the pressure sensitive sensor based on an output signal from the pressure sensitive sensor; and

control means which controls the driving means in accordance with a determination signal from the determination means.

30 10. A bed according to claim 9, wherein the pressure sensitive sensor is formed by a non-linear flexible member which displacement amount with respect to a load is non-linear and a piezoelectric sensor with flexibility which deforms according to a

displacement of the non-linear flexible member.

11. A bed according to claim 10, wherein the non-linear flexible member is configured by a thin type elastic material which is formed in a belt shape and has a convex portion.

12. A bed according to claim 10 or 11, wherein the non-linear flexible member and the piezoelectric sensor are disposed in deformation means capable of deforming according to a load.

13. A bed according to claim 12, wherein the deformation means has a hollow portion so that at least one of the non-linear flexible member and the piezoelectric sensor can be deformed easily.

14. A bed according to one of claims 9 to 13, wherein that the determination means determines whether or not a bedded person continues to touch the pressure sensitive sensor based on an output signal from the pressure sensitive sensor.

15. A bed according to one of claims 9 to 14, wherein the control means is arranged to validate the determination signal from the determination means when the driving means performs the elevational driving and to invalidate the determination signal from the determination means when the driving means does not perform the elevational driving.

16. A bed comprising:
a low-repulsion urethane layer; and
a pressure sensitive sensor disposed on a lower surface of the low-repulsion urethane layer.

17. A bed comprising:
a low-repulsion urethane layer;
a cushion lawyer made of usual urethane disposed on a lower surface of the

low-repulsion urethane layer; and

a pressure sensitive sensor disposed on a lower surface of the cushion lawyer.

18. A bed according to claim 16 or 17, wherein the pressure sensitive sensor
5 is configured by a cord-shaped piezoelectric sensor with flexibility.

19. A bed comprising:

a rigid plate having unevenness formed on a surface thereof; and

a bed pad which is disposed on the rigid plate and recited in one of claims 16 to

10 18.

20. A bed comprising:

a bed frame;

a movable plate attached on the bed frame so as to be able to incline; and

15 a bed element which is disposed on the movable plate and recited in claim 19.